PB85-213676

Superfund Record of Decision (EPA Region 2) Burnt Fly Bog Site, New Jersey, November 1983

(U.S.) Environmental Protection Agency
Washington, DC

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U.S. Department of Commerce
National Technical Information Service
NTIS

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Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R02-83/002
November 1983

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EPA

Superfund Record of Decision:

Burnt Fly Bog Site, NJ

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16. ABSTRACT

The Burnt Fly Bog site is located in Marlboro Township, Monmouth County and Old Bridge Township, Middlesex County, New Jersey. Between 1950 and 1956, the site had been used for lagoon storage and settling of reprocessed oil, storage of filter clay from oil reprocessing operations, sanitary landfilling, and sand and gravel pit operations. During these operations, hazardous substances were improperly disposed of resulting in contamination throughout the 60-acre study area.

The selected remedial action for this site includes: excavation and disposal off-site liquids, sludges, asphalt piles, drums, contaminated soil from lagoons and wetlands, restore site contours and vegetation; monitor ground water for 5-year period. The approach is a three-phase action.

Capital costs for the selected alternative are estimated at $2,200,000 for Phase I, $5,110,000 for Phase II and $60,000 per year for operation and maintenance.

Key Words: Depth of Excavation; Off-Site Disposal; Soil Excavation; Contamination Assessment; Supplemental ROD; Wetlands; Ground Water Contamination; Ground Water Monitoring; Public Exposure; Site Restoration

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Burnt Fly Bog, NJ Contaminated media: gw, sw, soil, wetlands Key contaminants: VOCs, solvents, PCBs, metals, oils		

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ROD BRIEFING ISSUES

Site: Burnt Fly Bog, New Jersey Date:

Region: II

Briefing Date: November 16, 1983

ISSUES AND RESOLUTIONS	KEY WORDS
1. The remedial action selected for this site involves excavation and off-site disposal of lagoon liquids, sludges, asphalt piles, drums and contaminated soils. Concentration vs. depth and percent removal vs. cost curves were developed and used in determining the estimated volume of material to be removed. Based on this analysis, the recommended depth of removal was 4 feet. It was further determined that the level of contamination in the remaining soil would not pose a health threat since the site is in a ground water discharge zone (as opposed to a recharge area), the level of contamination in the soil below 4 feet is very low and mobility of the contaminants is minimal. Removal to a depth of approximately 4 feet will provide roughly 90% contaminant removal; going beyond that depth results in rapidly decreasing marginal benefits at a significantly higher cost.	. Cost Effectiveness . Excavation Depth . Off-Site Disposal
2. It was agreed that further study of the westerly wetlands was appropriate in order to assess the extent of contamination. A supplemental ROD will be submitted if design and implementation of a remedial plan is necessary.	. Contamination Assessment . Supplemental ROD
3. There appears to be no indication that contaminants in the ground water are migrating towards private wells in the surrounding area. However, due to potential retardation	. Ground Water Contamination . Ground Water Monitoring . Public Exposure

ISSUES AND RESOLUTIONS	KEY WORDS
of contaminants by fine grain soil materials, future contamination of private wells may occur. The design of a comprehensive 5-year ground water monitoring program was approved to ensure the integrity of the cleanup.	
4. Removal of contaminated material will not restore the physical integrity and biological life of the site. Because of the erosion-prone features of the site and the unstable slope resulting from removal activities, the design of a site restoration plan was approved.	. Site Restoration

Record of Decision

Remedial Alternative Selection

Site: Burnt Fly Bog, Marlboro Township, Monmouth County and Old Bridge Township, Middlesex County, New Jersey

Analysis Reviewed

I have reviewed the following documents describing the analysis of cost effectiveness of remedial alternatives at the Burnt Fly Bog Site.

-Environmental Information Document, Engineering Study for Clean-up of Burnt Fly Bog, Marlboro Township, New Jersey, Dames & Moore, March 1983;

-Staff summaries and recommendations; and

-Recommendation by the New Jersey Department of Environmental Protection (NJDEP).

Description of Selected Option

1. Phase I Remedial Action

- Design and implementation of the excavation and off-site disposal of hazardous substances in lagoon 1, the asphalt pile area, the tar patch area and the drummed waste area. Contaminated lagoon water will be disposed of at a commercial treatment facility while drummed liquid waste will be incinerated. The tar patch waste will be disposed of at an off-site intermediate sludge landfill while lagoon 1 sludge, asphalt pile area waste and the drummed solid waste will be disposed of at an off-site secure chemical landfill. All disposal facilities are in compliance with Subtitle C of RCRA.

- Design of the excavation and removal of hazardous substances in lagoons 2, 3 and 4, the northerly wetlands and the contaminated soils area.

- Design of a site restoration plan.

- Design of a comprehensive 5-year groundwater monitoring program. This will include testing of 8 area residential wells.

- Further study of the westerly wetlands to determine the extent of contamination in this area.

2. Phase 2 Remedial Action

- Implementation of the excavation and off-site disposal of hazardous substances in lagoons 2, 3 and 4, the northerly wetlands and the contaminated soils area. The hazardous substances shall be disposed of at an off-site secure chemical landfill that is in compliance with Subpart C of RCRA.

- Restoration of original site contours and revegetation of the area.

Declaration

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), and the National Contingency Plan, I have determined that groundwater monitoring including the testing of area residential wells, further study of the westerly wetlands, and excavation and off-site disposal of the lagoon liquids, sludges and contaminated soils, tar patch area, asphalt piles, drums, contaminated soils area and northerly wetlands surface soils at the Burnt Fly Bog site are a cost-effective remedy, and that this remedy mitigates and minimizes damage to and provides adequate protection of public health, welfare and the environment.

I have also determined that the action being taken is appropriate when balanced against the need to use Trust Fund money at other sites. In addition, I have determined that the off-site transport of hazardous substances is more cost-effective than other remedial actions and therefore consistent with Section 101(24) of CERCLA.

Lee M Thomas, Assistant Administrator
Office of Solid Waste & Emergency Response

NOV 16 1983

Burnt Fly Bog Site Remedial Action
Briefing Document

°Purpose of this briefing is to obtain AA approval for the remedial action plan recommended by the Region and the State for the Burnt Fly Bog Site. A "Record of Decision" has been prepared to document the approval.

°The Burnt Fly Bog Site encompasses approximately 60 acres of the 1700 acre bog.

°Between 1950 and 1965, the site had been used for lagoon storage and settling of reprocessed oil, storage of filter clay from oil reprocessing operations, sanitary landfilling, and sand and gravel pit operations. During this time, a portion of the uplands area of the site had been used to deposit hazardous substances, some of which have escaped to other portions of the site.

°Site defoliation and past earth moving activities have caused severe erosion to occur resulting in the movement of significant amounts of site soils from upland areas toward lower lying areas.

°Due to the high groundwater table, the highly contaminated conditions at the site are of particular concern because the site is located in an outcrop area of Englishtown Sands which serves as an important aquifer in Monmouth County. Also, contaminated surface runoff may reach Deep Run wnere recharge basins have been constructed for the Raritan Magothy aquifer.

°The primary waste areas consists of four (4) lagoons, drum storage area, tar patch area, asphalt pile, northerly wetlands, contaminated soils area and westerly wetlands.

°Dames & Moore completed a feasibility study in March 1983 as required by the existing Cooperative Agreement. This study was funded by "pre-Superfund" RCRA monies.

°The feasibility study investigated three (3) separate cleanup issues i.e., waste removal, groundwater management and site closure.

°Incineration, chemical stabilization, on-site landfarming and on-site landfilling were eliminated as on-site treatment and disposal options for the following technical reasons:

Incineration - There are no mobile incinerators presently available which can reliably incinerate PCB waste. In addition, the process would generate ash residual, wastewater, and air emissions residuals which will require treatment or secure disposal. The incinerated contaminated soils would also require on-site laboratory analysis to determine if disposal on-site is appropriate or if off-site disposal is necessary due to the presence of heavy metals or PCBs.

Chemical Stabilization - The nature of the contaminants in the soils at this site connot be effectively stabilized.

On-Site Landfarming - This system will not effectively treat the heavy metal soil contamination. In addition, the presence of these metals will inhibit the decomposition of the organic contaminants.

On-Site Landfilling - Landfilling on-site would require deposition of materials below ground water levels. Although a liner would be used, off-site migration would be difficult to control.

Mechanical sludge dewatering and on-site waste water treatment were evaluated to be technically feasible but would be much more costly than the recommended option.

°For off-site removal of waste, each waste area referenced above was investigated separately. For each waste area, different alternatives were derived and compared on a cost-effective basis.

°The following outlines the level of contamination in each waste area along with the recommended alternative and associated cost.

a. Lagoon 1 - Organic Phase

The analytical results indicate the presence of various toxic metals including lead which was measured at a concentration of 1300 ppm. It is recommended to allow the organic liquid phase to mix into the sludge by pumping out the aqueous layer.

b. Lagoon 1 - Aqueous Phase

The aqueous phase was found to be relatively free of contamination but must be pumped out to allow removal of the sludge. Disposal at a RCRA approved facility at a cost of $90,000 is recommended.

c. Lagoon 1 - Sludge Phase

Sludge material was found to contain high levels of toluene (14.3 ppm), ethylbenzene (13.4 ppm), trichloroethylene (11.5 ppm), PCB (30 ppm), zinc (1100 ppm), and lead (3200 ppm). Removal to an off-site RCRA approved landfill at a cost of $600,000 is recommended.

d. Tar Patch Area

It is recommended to remove the tarry surface material to an intermediate sludge landfill at a cost of $60,000.

Pollutants found in this area include methylene chloride at 0.3 ppm, tetrachlordethylene at 0.3 ppm, and trichloroethylene at 0.5 ppm.

e. Asphalt File

All samples indicate the presence of methylene chloride in concentrations ranging from 305-2950 ppb. It is recommended to remove this material to an off-site RCRA approved landfill at a cost of $500,000.

f. Drums

There are approximately 350 drums present containing petroleum still bottoms, contaminated solvents, waste oils and contaminated materials. Removal of solids to an off-site RCRA approved landfill and off-site incineration of flammable liquids, all for a cost of $50,000, is recommended.

g. Lagoons 2, 3 and 4 Sludge

Analytical results indicate high concentrations of lead (35,000 ppm), PCB (55 ppm), zinc (12,000 ppm), toluene (78 ppm) and total xylene (440 ppm). Removal to an off-site secure chemical landfill at a cost of $3,300,000 is recommended.

h. Northerly Wetlands

High toxic metal concentrations i.e. lead (320 ppm), chromium (29 ppm), and arsenic (38 ppm), were found. Removal to an off-site secure chemical landfill at a cost of $220,000 is recommended.

i. Contaminated Soil

High concentrations of PCB (245 ppm) and lead (5600 ppm) were found. Removal to an off-site secure chemical landfill at a cost of $1,000,000 is recommended.

j. Westerly Wetlands

Further study of the westerly wetlands is being proposed to determine the extent of contamination. This 17-acre area was not included in the original scope of work, however, a test sample was taken in the area which showed possible contamination of heavy metals (lead at 11000 ppm) and PCBs (3.4 ppm).

°For groundwater management, alternatives were prepared for both aquifer management and end use management. The aquifer management alternatives included no action with monitoring, passive collection with on-site treatment, passive collection with discharge to municipal sewer, complete containment and disposal, partial containment and disposal, and active removal and disposal of contaminated groundwater. Alternatives for end-use management included no action with additional testing, treatment at point of use, installation of new well and connection to municipal water supply. However, all present groundwater monitoring data confirm that the groundwater contamination at the site is not serious and well below applicable drinking standards. It is recommended that the groundwater monitoring program be continued for 5 years to ensure the integrity of the cleanup.

°For site restoration, three (3) different alternative plans along with the no action plan were evaluated. While waste removal will nearly eliminate the potential for future releases of hazardous substances to the environment, it will not restore the physical integrity and biological life of this area. Physical integity will gradually and in some cases significantly deteriorate due to the erosion-prone features of the surface, as well as the unstable slope left behind as a result of waste removal activities. It is therefore considered appropiate to regrade the area.

The regulatory agencies are currently trying to establish the current owners, as well as previous owners, as the responsible parties. The cost of the regrading plan will be included in any litigation concerning recovery of money.

°A public hearing was held in Marlboro Township on March 30, 1983. Approximately 50 people were in attendance. The State presented a summary of results and the recommended remedial action plan to those in attendance for review and comment. The public comment period was held open for 30 days. No substantial criticism regarding the remedial plan was noted.

°Future public meetings are planned by the State as part of the Community Relations Plan to update concerned citizens regarding progress in this cleanup program.

°The State has taken the lead on enforcement actions regarding this site. Since 1979, there have been legal proceedings inlcuding the State and previous owners of the property to establish among other items, the details of past operation. Currently, the site is associated with litigation to establish the party (or parties) legally responsible for the site in order to recover future costs of site cleanup.

°The recommended approach for this project is a three (3) phased one which can be outlined as follows:

Phase I Remedial Action

-Design and implementation of the excavation and removal of hazardous substances in lagoon 1, the asphalt pile area, the tar patch area and the drummed waste area.

-Design of the excavation and removal of hazardous substances in lagoons 2, 3 and 4, the northerly wetlands and the contaminated soils area. Included in this is the design of a site restoration plan.

-Design of an extensive 5-year groundwater monitoring program. This shall include testing of 8 area residential wells.

-Further study of the westerly wetlands.

Phase II Remedial Action

-Implementation of the excavation and removal of hazardous substances in lagoons 2, 3 and 4, the northerly wetlands and the contaminated soil area.

-Restoration of original site contours and revegetation of the area.

Phase III Remedial Action

-Based upon the further study of the westerly wetlands, design and implementation of a remedial plan for this area may be needed. This design and implementation, if needed, shall be the subject of a supplemental ROD.

Phase I

°The removal of the visually contaminated substances in lagoon 1, the tar patch area, the asphalt pile area and the drummed waste area is being proposed as a Phase I Remedial Action for the following reasons:

-The feasibility study has identified this measure as a cost-effective, feasible and necessary to limit the threat of exposure to a significant health hazard.

-Since removal involves visually contaminated substances, minimal design activities are required.

-Removal of these substances will greatly facilitate design of the Phase II Remedial Action because completion of this phase will improve access to lagoons 2, 3 and 4.

-Expensive mobilization costs are not anticipated since no high technology procedures are being proposed.

Phase II

°The estimated amount of hazardous material to be removed from lagoons 2, 3, and 4, the northerly wetlands and the contaminated soils area is based upon the sampling and testing that was performed during the feasibility study. Duplicate sampling was conducted in June 1983 which verified the results of the original sampling.

°The sampling results indicate significant decreases in concentrations of hazardous substances in the vertical direction. Concentration vs depth and percent removal vs cost curves were developed and used in determining the estimated volume of material to be removed. These curves and a discussion of the line of reasoning used in estimating the volumes to be removed are attached as Appendix A.

°The volume of materials to be excavated from lagoons 2, 3, and 4 and the northerly wetlands is based on the removal of materials to the depth of four feet. For the following reasons, the level of contamination in the soil below this depth will not constitute a threat to human health and the environment: Because (1) the site is in a groundwater discharge -- rather than recharge -- zone; (2) the level of remaining contamination in the soil is very low (arsenic, below 2 ppm; lead, below 50 ppm; and PCBs, below 10 ppm); and (3) the mobility of these contaminants through the soil is also low. The level of contamination of the groundwater and the surface water beyond the perimeter of the site is not expected to exceed drinking water standards.

°Costs for the recommended alternative are estimated at $2,200,000 for the Phase I Remedial Action, $5,110,000 for the Phase II Remedial Action and $60,000 per year for Operation and Maintenance.

°The above costs breakdown as follows:

Activity		Cost ($)
Phase I Remedial Action		
- Phase I Removal		
-Design & Excavation		$200,000
-Lagoon 1 Liquid Removal		90,000
-Lagoon 1 Sludge Removal		600,000
-Tar Patch Area Removal		60,000
-Asphalt Pile Area Removal		500,000
-Drummed Waste Removal		50,000
-Engineering Support		100,000
-Contingencies		200,000
	TOTAL	$1,800,000
-Design of Phase II Remedial Action (includes study of westerly wetlands)		$ 360,000
-Design of Monitoring Plan (includes well testing)		40,000
Phase II Remedial Action		
-Lagoons 2, 3 and 4 Removal		3,300,000
-Contaminated Soil Removal		1,000,000
-Northerly Wetlands Removal		220,000
-Site Restoration		336,000
-Engineering Support		254,000
	TOTAL	$5,110,000
O&M		
-Groundwater Monitoring		56,000/year
-Post-Closure Care		4,000/year

°The State has agreed with the above approach.

°The "Record of Decision" certifies that:

-The selected remedial action is a cost-effective remedy for the site.

-Further testing is necessary for the westerly wetlands.

-Further testing and monitoring of groundwater is necessary.

-Monies are available in the Fund to finance the Phase I Remedial Action.

°The following actions are required to move the project into construction:

-Approve proposed remedy	AA, OSWER
Implement Phase I Remedial Action	State
Obtain funding of Phase II Remedial Action	OSWER
Implement Phase II Remedial Action	State
Approve proposed remedy for Westerly Wetlands (WW)	AA, OSWER
Design WW removal	State
Implement WW removal plan	State

REMEDIAL IMPLEMENTATION ALTERNATIVE SELECTION

BURNT FLY BOG SITE
MARLBORO, NEW JERSEY

History

The Burnt Fly Bog site is located near the intersection of Texas and Spring Valley Roads in Marlboro Township, Monmouth County and Old Bridge Township, Middlesex County, New Jersey. Although the bog encompasses some 1700 acres, the study area is limited to approximately 60 acres; namely the site proper and some of the affected adjacent areas. The site proper consists of (1) an uplands area - Lot 43 - where a majority of the wastes were originally deposited, i.e., four (4) lagoons, asphalt pile, tar patch area, and drummed materials; and (2) low-lying areas to the north - Lots 6 and 6A including the northerly wetlands and old sanitary landfill, where wastes have migrated due to lagoon overtopping, storm run-off, etc. Also included in the study area is a 17-acre low-lying portion west of the site proper, the westerly wetlands, to which contamination may have migrated.

The study area has undergone several changes in ownership since about 1950. However, use of different portions of the site between 1950 and 1965 always included one or more of the following:

1. use of the lagoons for reprocessed oil storage or settling,

2. storage of the filter clay from an oil reprocessing operation,

3. sanitary landfill, and/or

4. sand and gravel pit operations.

During these operations, hazardous substances were improperly disposed of resulting in contamination throughout the study area. The area designated as the site proper was owned and operated by Eagle Asphalt Company, a road-oiling business, from about 1950 until 1964. Lagoons were developed during this period for storage of the reprocessed oil and as settling ponds. In November 1964, Mr. Eckel purchased the property from Eagle Asphalt Company and sold it to Mr. Dominck Manzo in July 1965.

The old sanitary landfill was begun by Mr. Towler and received local trash. Upon his death in 1961, landfill operations ceased. This property was purchased by Mr. Dominick Manzo in December 1963 and again utilized as a sanitary landfill until 1967. A court order disallowed continued use in 1969.

On October 26, 1973, a fire began in the lagoon area and burned for 16 hours before it was extinguished with the use of chemical foam. Pockets of oil and toxic materials feeding the fire were blown up by a demolition team from the Earle Ammunition Depot located in Middletown Township.

The fire at the site appears to have brought the area and its potential hazardous/toxic problems more fully into public view. Since approximately 1970, there have been legal proceedings including the New Jersey Department of Environmental Protection (NJDEP) and previous owners of the Study Area to establish, among other items, the details of past operations. Currently, the site is associated with litigation to establish the parties legally responsible for the site, to recover NJDEP monies spent, and to establish a source of funds to recover future costs of site cleanup.

In April 1982, a 900-foot security fence was installed to prohibit site access. A 6-foot section of dike was also repaired to prevent spillage of lagoon liquid.

Current Status

A feasibility study has been prepared by Dames & Moore. The purpose of the study was to develop recommendations for appropriate Remedial Action for Waste Removal and Disposal, Groundwater Management and Site Closure. To achieve this goal, Dames & Moore performed a variety of tasks to supplement the existing site data base, defined the existing site problems, formulated and comparatively evaluated alternative remedial action options and plans, and developed recommendations for remedial measures to be implemented.

In order to supplement the existing site data base, they performed a one time, site-wide sampling program of wastes, soils, surface water and groundwater, which combined with the previous data would provide bases for conclusions and recommendations. Chemical analyses which were performed on the collected samples indicate that lagoon wastes have migrated to other low lying areas of the site, due to overtopping or breaching of the lagoon dikes. The composition of the sampled wastes included many EPA priority pollutants, both organic and inorganic, including PCBs. The presence of these wastes, together with erosion has occurred at the site due to man's activities, account for the site distress which is currently observed.

Investigation

1. Lagoon System

°The on-site system consists of 4 separate cells situated within the site proper.

°Lagoon 1 contains free liquid which is bilayered with a thin, floating organic layer (volume = 1,100 gallons) and a large aqueous phase (volume = 450,000 gallons). The organic and sludge phases of this lagoon were found to contain various levels of organic contamination as well as trace amounts of toxic metals. The aqueous phase was relatively free of such contamination.

°Lagoons 2, 3, and 4 resemble the level of contamination of the sludge phase of lagoon 1 with significant levels of PCBs.

2. Tar Patch Area

°Pollutants found in this area consist of methylene chloride at 0.3 ppm, tetrachloroethylene at 0.3 ppm, and trichloroethylene at 0.5 ppm.

3. Asphalt Pile

°All samples taken indicate the presence of methylene chloride in concentrations ranging from 305-2950 ppb.

4. Drummed Materials

°Majority were found in poor structural condition and will require transfer/repackaging and removal. Contents are of solid and semi-solid materials, flammable solvents and oils along with empty degraded drums.

5. Northerly Wetlands (north of lagoon 1)

°Contaminated with organic and inorganic waste constituents including PCBs.

6. Westerly Wetlands (west of the four lagoons)

°Surface waste appears over a 10-acre area at a depth of one foot covered by an average depth of eight inches of slowly flowing water. Analysis indicates the presence of organics and some PCBs

7. Groundwater Analysis

°Subsurface data collected suggest that in this area the Englishtown Formation underlying the western portion of the study area consists of 2 saturated sandy units (upper and lower aquifers) separated by a black upper clay lens.

°It appears that the upper clay unit may underly all the study area's known surface contamination (lagoons, asphalt pile, defoliated area and westerly wetlands). This unit retards the downward flow between the 2 shallow aquifers, but also serves to channel potential contamination to the surface water discharge zone along the western portion of the site.

°Although the groundwater flow in the upper aquifer is to the west and away from most of the area homes and private wells, the presence of a groundwater mound beneath lagoon 1 provides the potential for movement of some contaminants toward the east and southeast where a majority of the homes are located.

°Based upon priority pollutant analysis of one set of groundwater samples from 8 domestic wells, there appears to be little or no suggestion of such contaminants migrating to those wells. However, due to potential retardation of contaminants by fine grain soil materials, some contaminants may not have yet reached the private wells.

8. Public Safety

°The abandoned hazardous waste site represents a potential danger to people trespassing on the area and/or handling pets that have visited the site.

°Because the site is a large, open area it is attractive to children; there has been one documented case of lead poisoning of a child who habitually played at the site (only lagoon 1 is properly fenced).

For each of the waste types and site areas, a number of feasible remedial actions options were considered with respect to technical adequacy, cost-effectiveness, environmental impacts and regulatory considerations, in order to formulate a Recommended Remedial Action Plan.

Much of the recommended Remedial Action Plan involves the removal of site wastes and contaminated soils to off-site secure chemical disposal facilities. This would be followed by a Site Regrading Plan in which the site topography is improved and regraded with denuded surface areas revegetated.

On March 30, 1983, at a public hearing in Marlboro Township, New Jersey, the recommended remedial action plan of the Dames & Moore Report were presented by the State of New Jersey. The State's reply to the public comments are attached.

Recommended Alternatives

Section 300.67(j) of the National Contingency Plan (NCP) states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable) and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment. Based on our evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public, information from earlier technical studies, and with concurrence from the State, we have determined that the following remedial action plan meets the NCP criteria.

Phase I - Remedial Action

-Design and implementation of the excavation and removal of hazardous substances in lagoon 1, the asphalt pile area, the tar patch area and the drummed waste area.

-Design of the excavation and removal of hazardous substances in lagoons 2, 3, and 4, the northerly wetlands and the contaminated soils area. Included in this is the design of a site restoration plan.

-Desigh of an extensive 5-year groundwater monitoring program. This shall include testing of 8 area residential wells.

-Further study of the westerly wetlands.

Phase II - Remedial Action

-Implementation of the excavation and removal of hazardous substances in lagoons 2, 3 and 4, the northerly wetlands and the contaminated soil area.

-Restoration of original site contours and revegetation of the area.

Phase III - Remedial Action

-Based upon the further study of the westerly wetlands, design and implementation of a remedial plan for this area may be needed. This design and implementation, if needed, shall be the subject of a supplemental ROD.

The cost of the Phase I Remedial Action is $2,200,000, the cost of the Phase II Remedial Action is $5,110,000 and the O&M cost is $60,000/year. Operation and maintenance includes groundwater monitoring for five (5) years and post-closure care for 10 years, at the end of which the O&M requirements must be reevaluated.

Proposed Action

We request your approval of the above plans as the remedial implementation option for the Burnt Fly Bog. The attachment which follows will provide additional information to support the documentation for this decision.

APPENDIX "A"

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
8 E. Hanover St., CN 028, Trenton, N.J. 08625

Marwan Sadat
DIRECTOR

Jorge Berkowitz
Administrator

27 Oct 1983

Mr. John Frisco, Chief
Hazardous Site Remediation Section
USEPA - Region II
26 Federal Plaza
New York, NY 10278

RE: Burnt Fly Bog
Cooperative Agreement

Dear Mr. Frisco:

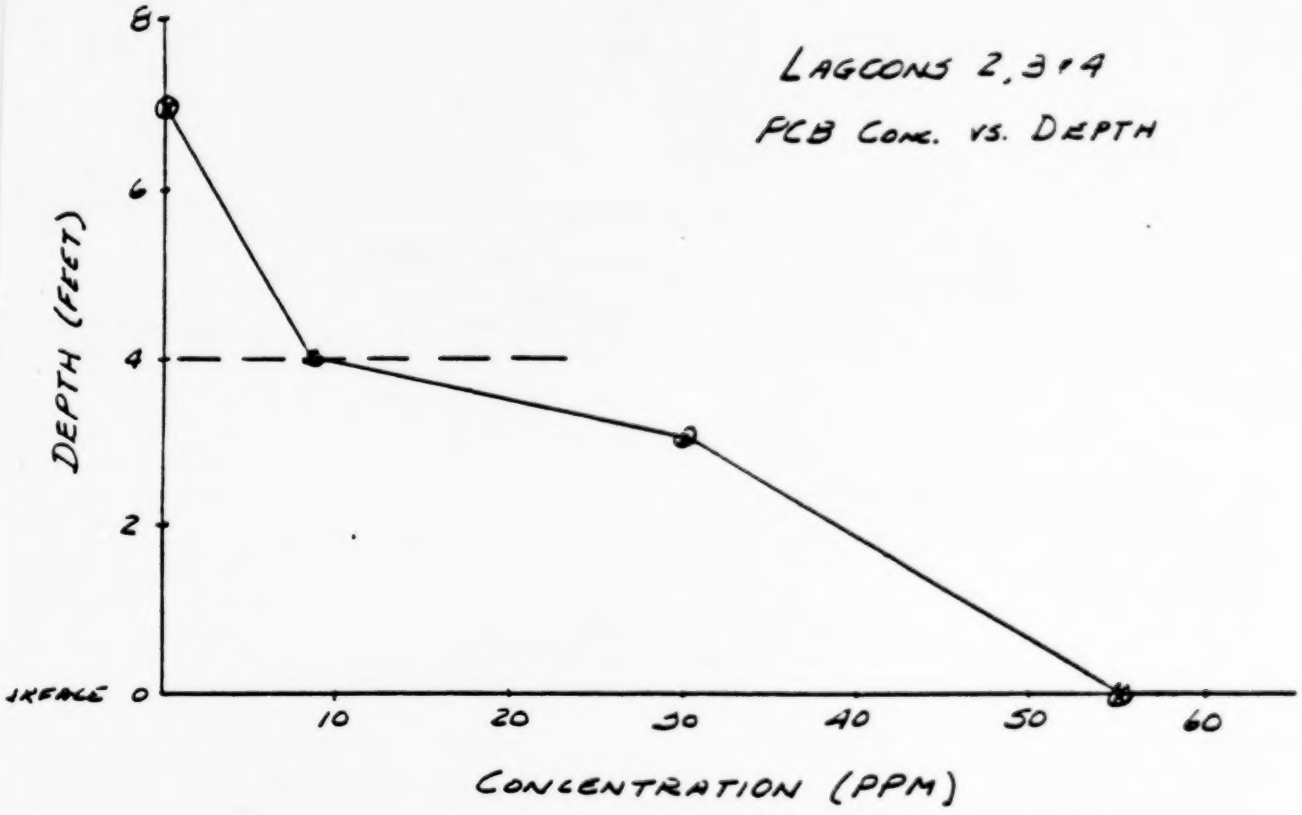
This is to provide our response to questions raised at our meeting with you and members of EPA headquarters staff in Washington, D.C. on October 25, 1983.

The following discussion illustrates our rationale for determining the amount of excavation and removal of contaminated materials at the Burnt Fly Bog site in Marlboro, New Jersey. Its purpose is twofold; first, to provide, based on existing data, the logic used to determine the extent of excavation being proposed in the cooperative agreement and second, to illustrate a methodology that will be used during the design, when additional data is available, to confirm and refine the detailed cleanup plan.

This analysis is directed at the proposed removals in Lagoons 2, 3, and 4 since these are the largest excavations and represent the major cost in the Phase II remedial program. The cost breakdown for the Phase II program is as follows:

Lagoons 2, 3, & 4	$ 3.1 million
Contaminated soils	1.0 "
Northerly wetlands	.2 "
Restoration	.3 "
Administration & Const. Supervision	.5 "
Total	$ 5.1 million

Based on soil analysis in the backfilled lagoons it can be seen that contaminant concentrations are decreasing with depth. This is shown on the enclosed plots of concentration vs. depth (figs. 1 & 2) for the


LAGOONS 2, 3 + 4
PCB CONC. VS. DEPTH
DEPTH (FEET)
8
6
4
2
INTERFACE 0
10
20
30
40
50
60
CONCENTRATION (PPM)

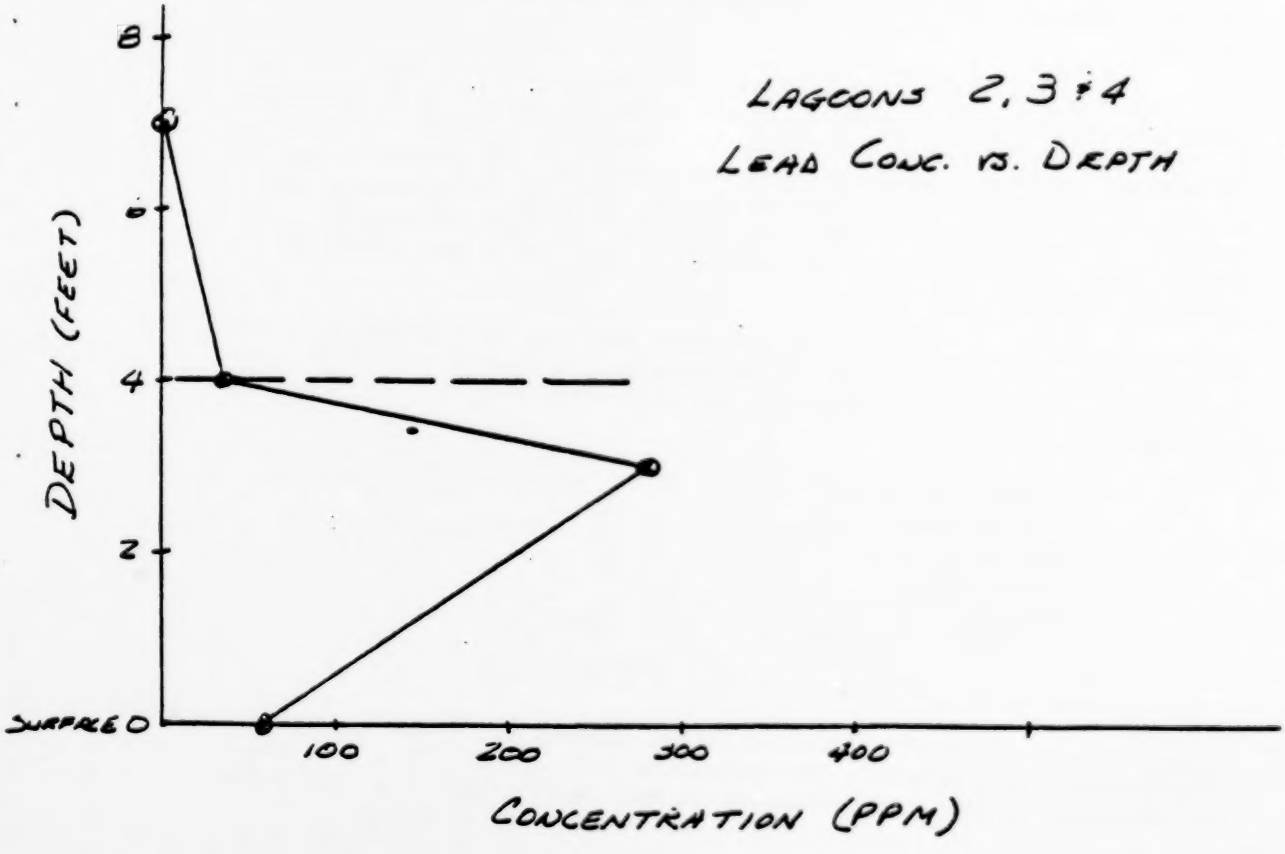

LAGOONS 2, 3 + 4
LEAD CONC. VS. DEPTH
DEPTH (FEET)
8
6
4
2
SURFACE 0
100
200
300
400
CONCENTRATION (PPM)

FIG. 1

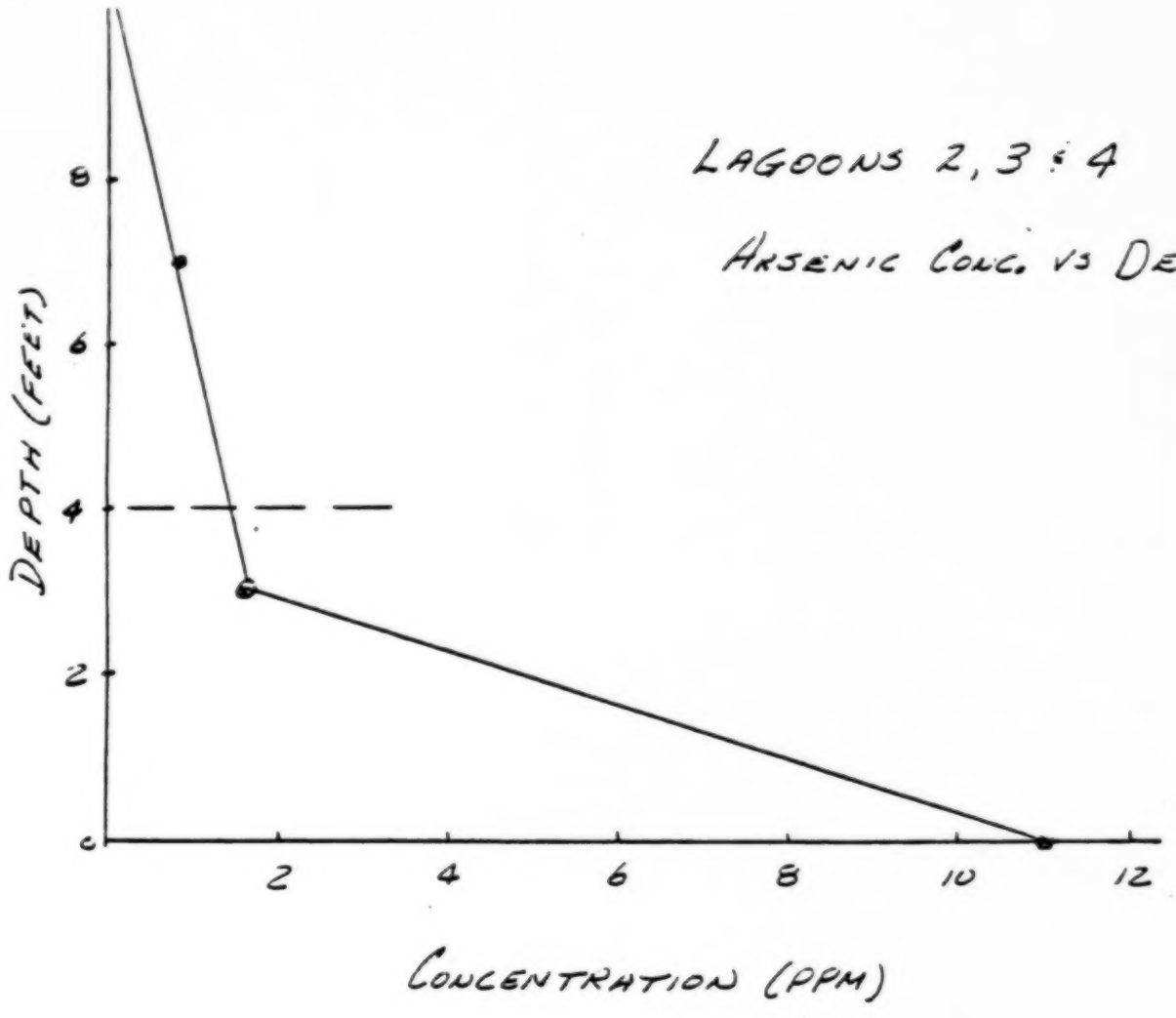

LAGOONS 2, 3 & 4
ARSENIC CONC. VS DEPTH
DEPTH (FEET)
8
6
4
2
0
2
4
6
8
10
12
CONCENTRATION (PPM)

FIG. 2.

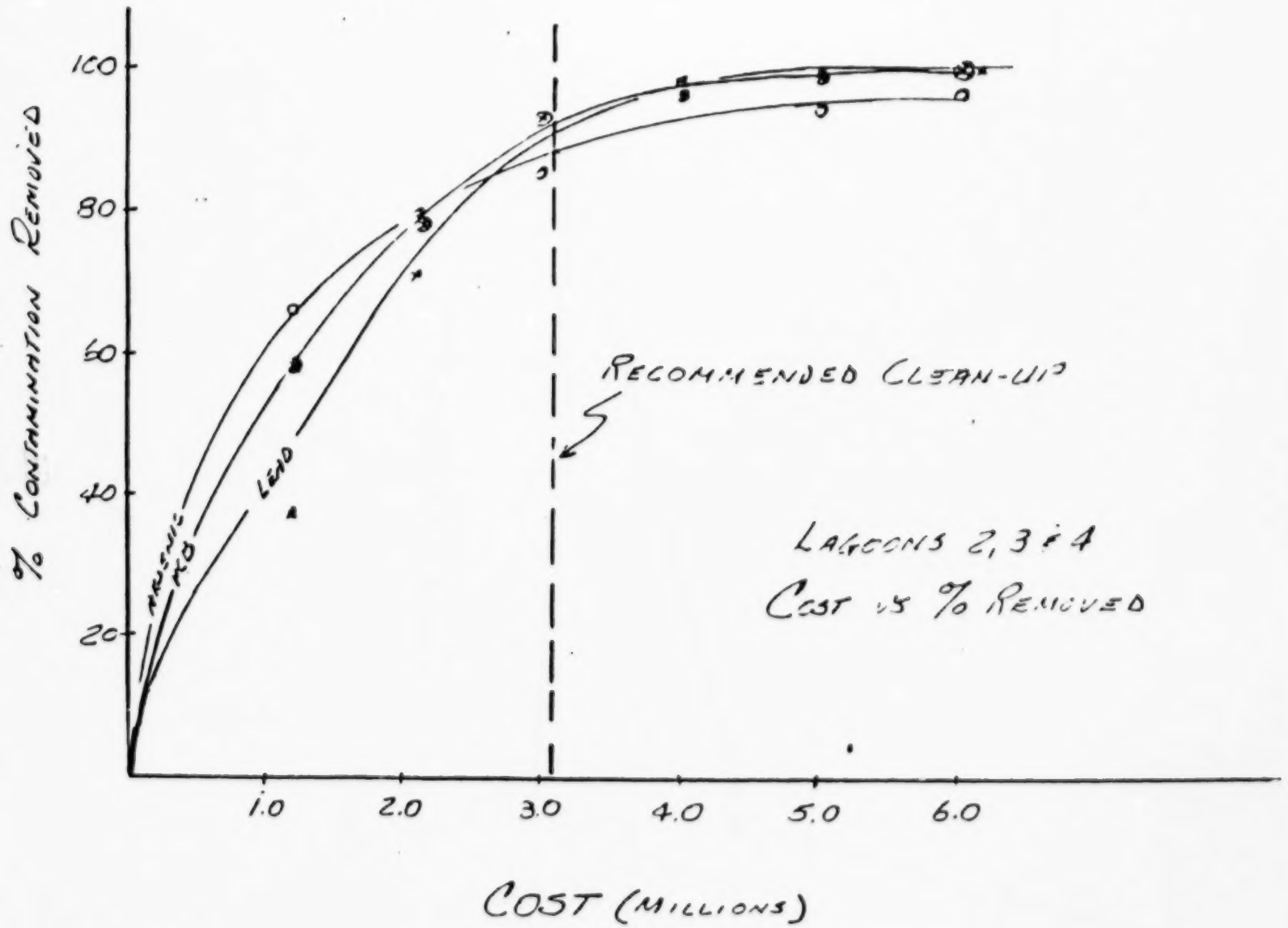

% CONTAMINATION REMOVED
100
80
60
40
20
ARSENIC
MO
LEAD
RECOMMENDED CLEAN-UP
LAGOONS 2, 3 & 4
COST VS % REMOVED
1.0
2.0
3.0
4.0
5.0
6.0
COST (MILLIONS)

FIG. 3

three main contaminants of concern, PCBs, lead and arsenic. From these plots it is possible to estimate percent contaminant removal at various excavation depths by calculating the area under the curve and dividing by the total area. These percent removals were then plotted against the cost of excavation and disposal at the corresponding depths. This plot is also enclosed (fig. 3).

Figure 3 shows that the recommended cleanup to approximately a 4 foot depth, at a cost of $3.1 million, will provide roughly a 90% contaminant removal. While going to only 3 feet would save about $1 million, this would provide only 75-80% removal. In the other direction, going to 5 feet would only provide an additional 3-4% removal at the cost of an additional $1 million. We therefore feel that the recommended cleanup for the lagoon areas is reasonable and cost-effective and that going much beyond 4 feet results in rapidly decreasing marginal benefits at a significantly higher cost. In addition, given the fact that additional sampling will be done during design, we feel confident that the contamination levels that remain after the 4 foot removal will be sufficiently low as to pose no further hazard at this site.

As stated earlier, this analysis is directed at the lagoon areas. The contaminated soil and northerly wetland areas do not lend themselves to this type analysis since these areas exhibit basically a surface contamination problem and only a one foot removal is being proposed. However, as with the lagoon areas, additional sampling will be done during design to refine these estimates.

We feel that this analysis coupled with currently available data provides a reasonable and justifiable basis for proceeding with the approval of design and remedial construction for the Burnt Fly Bog project. As more detailed data becomes available during the design phase, this analysis will be further refined with the intent of providing a cost-effective and environmentally sound cleanup program.

Sincerely,

Dr. Jorge Berkowitz, Administrator
Hazardous Site Mitigation Administration

HS39:jdd
Enclosures

cc: Mr. Russell Wyer - USEPA - HQ

POLLUTANTS REMAINING

The following is a list of data points used in developing the precent removal vs. cost curve:

Parameter	Conc. (ppm) @ Various Depths		
	3'	4'	7'
Lead	280	32	BMDL
Arsenic	1.6	1.2	1.0
PCB	30	8.5	BMDL

RCRA and TOSCA standards call for lead and arsenic concentrations below 5 ppm and PCB concentrations below 50 ppm. As can be seen from the above table, if we stop excavation at three feet, we are leaving a significant concentration of lead. The 30 ppm of PCB, although below TOSCA'S 50 ppm standard, can still be considered significant. Excavation to seven feet would bring us below all standards, however, the cost curves were developed to determine the necessity and cost effectiveness of this. Using the above data, the cost curves and historical data as to the depth of the lagoon, excavation to a depth of four feet was deemed appropiate. As can be seen from the table, 32 ppm of lead is still present at this depth, as is 8.5 ppm of PCB. It must be noted that the sampling data is from the center of the lagoons and therefore represents the highest concentration at that depth. The sides of the lagoon are expected to be free of contamination at 4 feet. For cost estimation purposes, the four foot depth appears appropriate since it represents an average depth. Excavation at the center of each lagoon may extend beyond four feet but this should be compensated by the fact that peripheral excavation should be less than four feet. Boring work during the design phase will quantify the exact depth or excavation.